

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:  
**SMART & BIGGAR**  
 1501 - 10060 Jasper Avenue  
 Scotia Place Tower 2  
 EDMONTON, Alberta  
 Canada, T5J 3R8

## PCT

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing (date/month/year)      24 February 205 (24-02-2005))

**ON DOCKET**  
 RD. 2005 AUG 17  
 VTH

Applicant's or agent's file reference  
**58001-56**

**FOR FURTHER ACTION**  
 See paragraph 2 below

International application no  
**PCT/CA2004/001820**

International filing date (date/month/year)  
 12 October 2004 (12-10-2004)

Priority date (date/month/year)  
 17 October 2003 (17-10-2003)

International Patent Classification (IPC) or both national classification and IPC      G 01 N 37/00    G 01 N 21/59    G 01 N 33/28  
 G 06 F 17/00    G 06 F 17/14    G 06 F 17/40

Applicant    **ALBERTA RESEARCH COUNCIL INC. ET AL**

1. This opinion contains indications relating to the following items :

- |                                     |              |  |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the opinion   |
| <input type="checkbox"/>            | Box No. II   | Priority   |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention   |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited  |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application   |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application  |

#### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/CA  
*Commissioner of Patents*  
*Canadian Patent Office*  
*Box PCT, Ottawa/Gatineau K1A 0C9*

Authorized officer

Claude Plante (819) 997-1133

Facsimile No. (819) 953-9538

Form PCT/ISA/237 (cover sheet) (January 2004)

DOCK  
 HGT

*[Signature]*

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/CA2004/001820

**Box No. I      Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language which it was filed, unless otherwise indicated under this item.

- ☐ This opinion has been established on the basis of a translation from the original language into the following language \_\_, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of :

a. type of material

- ☐ a sequence listing  
☐ table(s) related to the sequence listing

b. format of material

- ☐ in written format  
☐ in computer readable form

c. time of filing/furnishing

- ☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments :

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/CA2004/001820

**Box No. V reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims	20,26-34,36-42,44,45	YES
	Claims	1-19,21-25,35,43	NO
Inventive step (IS)	Claims	28,36-42	YES
	Claims	1-27,29-35,43-45	NO
Industrial applicability (IA)	Claims	1-45	YES
	Claims	NONE	NO

**2. Citations and explanations :**

Reference is made to the following documents:

D1: US 2003/0154036  
D2: US 4743339  
D3: WO 97/14953  
D4: WO 92/17767  
D5: EP 727671  
D6: CA 2443098  
D7: CA 2337888  
D8: CA 2470477  
D9: T. Theophanides (ed.) Fourier Transform Infrared Spectroscopy.

Novelty(1)

Claims 1-3,10,11,16,17 lack novelty, as defined in Article 33(2) of the PCT, in view of D1.

D1 describes an apparatus and a method to measure parameters of a fluid mixture containing solid particles, and flowing in a pipe, where the measurements are effected by an array of pressure sensors (Abstract). The pressure measurements are Fourier-transformed and combined through a calculation-logic unit, to obtain a percent composition (Figure 1; page 3, par. [0038]). Conditioning of the signal is contemplated (pages 9 and 10, par. [0119]; page 11, par. [0137]-[0141]).

Novelty(2)

Claims 1,2,4-10 lack novelty, as defined in Article 33(2) of the PCT, in view of D2.

D2 describes a method for controlling the digestion of pulp, and analysing composition and concentration, using infrared spectroscopy (Abstract). A FTIR spectrometer is contemplated (Column 1, lines 6-10 and 58-60). Measurement by transmittance is contemplated (Column 2, lines 13-15). Furthermore, the method relies on changes of transmittance as a function of time (Figures 1a and 1b; Column 2, lines 42-47). Since there is controlling, the dispersion is manipulated during the time period. A flow-through cuvette is mentioned, so that the dispersion moves relative to the sensor (Column 2, lines 15-17).

Novelty(3)

Claims 1,2,4,5,10 lack novelty, as defined in Article 33(2) of the PCT, in view of D3.

D3 describes a method of predicting a property of a residual hydrocarbonaceous material, through measurement of near infrared spectra (Abstract). Among the materials mentioned are: crude oil residues including residues, residual fuel oils, and bituminous materials (page 2, lines 5-9). The method works on-line, using a Fourier-transform type of spectrometer (page 1, lines 11-13). A transmission cell is used (page 5, lines 25-27).

(CONTINUED IN SUPPLEMENTAL BOX I)

**Supplemental Box I**

In case the space in any of the preceding boxes is not sufficient.  
Continuation of : Box V

Novelty(4)

Claims 1,2,4,5,10 lack novelty, as defined in Article 33(2) of the PCT, in view of D4.

D4 describes a method for quantitative determination of fat in an emulsion which contains fat particles, such as milk or a milk product, using infrared absorption (Abstract). A Mattson FTIR spectrometer is used (page 7).

Novelty(5)

Claims 1,2,4,5,13,35,43 lack novelty, as defined in Article 33(2) of the PCT, in view of D5.

D5 describes a method and an apparatus for terahertz imaging, where the frequency dependence of absorption is analysed by collecting in the time domain a signal transmitted through the object, and then processing the signal for every pixel on that object (Abstract). Therefore, transformation occurs two-dimensionally. A Fourier transformation is contemplated (Column 4, lines 26-47).

Novelty(6)

Claims 1,2,4-6,10-19,21-25,35,43 lack novelty, as defined in Article 33(2) of the PCT, in view of D6.

D6 describes a method of conducting near-infrared chemical imaging for agricultural or food applications (Abstract). Crystal formation (hence, particles) in a material like ice cream is contemplated (page 2, lines 11-13; see also page 28). Another example is microorganism growth (page 13, lines 1-3). Monitoring change over time is contemplated (page 13, lines 18-20). Transmission is contemplated (page 16, lines 3-5). Fourier Transform Infrared spectroscopy (FTIR) is contemplated (page 17). Manipulating the mixture is contemplated (page 36, lines 16-31). Preprocessing is contemplated (page 39, lines 16-27). In pages 56-59, there is described analysis of an emulsion, comprising oil and water (Example 3), while Example 4 mentions average field-of-view spectra. Derivative presentation is mentioned on page 2, lines 18-27, as is ratio presentation. A display in terms of a characterising variable is contemplated (page 2, lines 22-24).

Novelty(7)

Claims 1,2,4-10,16-19,22,23 lack novelty, as defined in Article 33(2) of the PCT, in view of D7.

D7 describes a process for producing a lubricant base oil, where monitoring the production is done by measuring the absorption spectrum using FT-IR, and converting this absorption spectrum into a viscosity index (Abstract). The FT-IR measurement acts as a control (pages 1, 10, and 15). A stream is measured (pages 6 and 10), entailing that there is relative motion between the measuring system and the dispersion. Since D7 mentions that a 1.0 mm path length standard liquid IR cell fitted with KBr windows was used (page 13), a transmittance mode is clearly used. A range of values of the viscosity index is studied (see, e.g., page 10).

The feature (Claim 19) that the characterising variable relates to the amount of solvent mixed with oil is described by the relation between the viscosity index and the branchiness of the hydrocarbon mixture (page 4).

Inventive step(1)

Claims 44,45 lack an inventive step, as defined in Article 33(3) of the PCT, in view of the combination of D5 and D9.

A derivative of a spectrum is a well known preprocessing step in the art. It is mentioned in D9 (pages 57 and 162).

Inventive step(2)

Claims 20,44,45 lack an inventive step, as defined in Article 33(3) of the PCT, in view of the combination of D6 and D9.

The additional feature of Claim 20 is that the characterising variable of the oil-water emulsion is time. Such a methodological step is known : D9 provides an example (pages 130-132).

Claims 44,45 encompass two-dimensional data preprocessing, in particular taking the derivative of the data. As the data of D6 are two-dimensional, and since derivative preprocessing is known in the art (as found in D9, pages 57 and 162), applying the latter to the former does not represent an inventive step.

(CONTINUED IN SUPPLEMENTAL BOX II)

**Supplemental Box II**

In case the space in any of the preceding boxes is not sufficient.  
Continuation of : Supplemental Box I (itself a continuation of Box V)

Inventive step(3)

Claims 26,27 lack an inventive step, as defined in Article 33(3) of the PCT, in view of the combination of D6 and D8.

The additional feature introduced by Claim 26 is the integration of the frequency-domain spectra between a lower frequency and an upper frequency.

This data processing step is well known in the art. An example is found in D8 (Figures 10,12,17,19,21; pages 9 and 10). As to the feature of Claim 27, it is found in D6 (page 2, lines 22-24).

Inventive step(4)

Claim 20 lacks an inventive step, as defined in Article 33(3) of the PCT, in view of D7 and D9.

The additional feature of Claim 20 is that the characterising variable of the oil-water emulsion is time. Such a methodological step is known: D9 provides an example (pages 130-132).

Inventive step(5)

Claims 26,27 lack an inventive step, as defined in Article 33(3) of the PCT, in view of the combination of D7 and D8.

Claims 26 and 27 introduce the steps of integrating the frequency-domain spectrum between a lower bound and an upper bound, hence generating a characterisation number, which characterisation number can be used to characterise the dispersion.

Integration of a peak area is well known in the art. An example is found in D8 (Figures 10,12,17,19,21; pages 9 and 10). Furthermore, the viscosity, viscosity index, and other chemometric factors mentioned in D8 (page 13) describe the subject matter of Claim 27.

Inventive step(6)

Claims 29-31 lack an inventive step, as defined in Article 33(3) of the PCT, in view of the combination of D7, D8, and D9.

Claims 29-31 add to Claim 27 the preprocessing step of taking the derivative of the spectrum data. As this is a well known preprocessing step in the art (see D9, pages 57 and 162), it would not represent an inventive improvement in jurisdictions where a combination of several known elements is not deemed inventive.

Inventive step(7)

Claims 32-34 lack an inventive step, as defined in Article 33(3) of the PCT, in view of the combination of D6, D8, and D9.

Claims 32-34 are similar to Claims 29-31, but feature two dimensional data, instead of one-dimensional data. Therefore, Claims 32-34 would not define inventive subject matter in jurisdictions where a combination of known elements is not deemed inventive.

Industrial applicability

Claims 1-45 comply with Article 33(4) of the PCT.

**Box No. VIII**

**Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made :

Claims

Claims 2 and 6 do not comply with Article 6 of the PCT. The claims do not clearly indicate where the additional method steps are to be inserted.

Figures 3,18,22-25,34,36,40-43 do not comply with Rule 11.2(a) of the PCT. The quality of these figures is too low to allow reproduction.

Figures 3,22-25,31,32,34 do not comply with Rule 11.13(a) of the PCT. The right-hand scale of these figures makes use of colouring.

The description does not comply with Rule 10.1(a) of the PCT. On page 46, lines 16-20, some pressures are expressed solely in psi units. Also, the solution gas-oil ratio is not expressed in metric units.

The part of the sentence on page 41, line 23, "a two dimensional transform such as two dimensional transform maybe used", is confusing.

Typographical errors are found on: page 20, line 8 ("is directed a method"); page 20, lines 31 and 32-33, page 21, line 28, page 22, line 10, page 28, lines 6-7, 13, and 18-19, page 29, line 32, page 34, line 22, and page 36, line 18 ("the within method"); page 25, lines 10 and 23 ("the within invention"); page 22, line 9 ("oil will may exhibit"); page 25, line 9 ("information from has not been").